SEQUENCE LISTING

<110> Frey, Joachim
       Stuber, Katja
       Thornton, Julian C
       Kuzyk, Michael A
       Burian, Jan

<120> TYPE III SECRETION PATHWAY IN AEROMONAS SALMONICIDA, AND USES
       THEREFOR

<130> VA/H-50095

<140> US 10/813,908
<141> 2004-03-26

<150> US 10/416,902
<151> 2003-05-15

<150> PCT/CA01/01589
<151> 2001-11-15

<150> US 60/248,864
<151> 2000-11-15

<160> 19

<170> PatentIn version 3.5

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Ile Thr Ile Gly Asp Asn Pro His Ser Leu Ile Gln Leu Glu Leu Glu
            20   25   30

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Gln Ser Gly Thr Leu Gln Leu Glu Arg His Gln Gly Gln Leu Thr Leu
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Trp Leu Ala Arg Ala Val Pro Trp His Gln Ser Gly Glu Ala Ile Arg
     50                  55                  60

Arg Ala Met Thr Leu Thr Ala Ala Ala Gln Gly Pro Ala Leu Pro Val
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Arg Ser Gly Trp Leu Gly Glu Glu Gln Leu Ile Leu Phe Val Ser Leu
              85                  90                  95

Asp Glu Arg Ala Val Thr Leu Pro Gln Leu His Gln Ala Val Thr Thr
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Leu Thr Arg Leu Gln Arg Glu Val Leu Ala Ser
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              20                  25                  30

Leu Pro Asp Gly Gln Ser Ile Glu Pro His Ile Ser Arg Leu Tyr Pro
         35                  40                  45

Glu Arg Leu Ala Asp Arg Val Leu Leu Asp Phe Ala Thr Pro Asp Arg
         50                  55                  60

Gly Phe His Asp Leu Leu Arg Pro Val Asp Phe Asn Gln Ala Met Gln
65                  70                  75                  80

Gly Leu Arg Ser Val Leu Ala Glu Gly Gln Ser Pro Glu Leu Arg Ala
              85                  90                  95

Ala Ala Ala Leu Leu Glu Gln Met His Ala Asp Glu Gln Leu Met Gln
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Met Thr Leu His Leu Leu His Lys Val
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Gly Trp Leu Gln Leu Gln Tyr Gly His Pro Asp Lys Ala Ser Val Leu
            20                  25                  30


Leu Ala Ala Leu Leu Gln Ile His Pro Asp His Gln Gly Gly Arg Arg
        35                  40                  45


Thr Leu Leu Val Ala Leu Leu Lys Gln Gly Glu Gly Glu Ala Ala Leu
    50                  55                  60


Ala His Val Asp Gln Leu Met Gln Gln Gly Glu Ala Asp Gly Pro Leu
65                  70                  75                  80


Trp Leu Cys Arg Ser Arg Ala Cys Gln Leu Ala Gly Arg Leu Asp Glu
                85                  90                  95


Ala Arg Phe Ala Tyr Gln Gln Tyr Leu Glu Leu Glu Glu Gln Asn Glu
            100                 105                 110


Ser Thr His Pro
        115


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Asp Ile Met Leu Ala Ile Leu Leu Leu Ala Ile Val Phe Met Met Val
            20                  25                  30


Leu Pro Leu Pro Pro Val Ala Leu Asp Ile Leu Ile Ala Ile Asn Met
        35                  40                  45


Thr Ile Ser Val Val Leu Leu Met Met Ala Val Tyr Ile Asn Ser Pro
    50                  55                  60


Leu Gln Phe Ser Ala Phe Pro Ala Val Leu Leu Ile Thr Thr Leu Phe
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65   70   75   80

Arg Leu Ala Leu Ser Val Ser Thr Thr Arg Met Ile Leu Leu Gln Ala
              85   90   95

Asp Ala Gly Gln Ile Val Tyr Thr Phe Gly Asn Phe Val Val Gly Gly
              100   105   110

Asn Leu Val Val Gly Ile Val Ile Phe Leu Ile Ile Thr Ile Val Gln
          115   120   125

Phe Leu Val Ile Thr Lys Gly Ser Glu Arg Val Ala Glu Val Ser Ala
      130   135   140

Arg Phe Ser Leu Asp Ala Met Pro Gly Lys Gln Met Ser Ile Asp Gly
145   150   155   160

Asp Met Arg Ala Gly Val Ile Asp Val His Glu Ala Arg Asp Arg Arg
              165   170   175

Gly Val Ile Glu Lys Glu Ser Gln Met Phe Gly Ser Met Asp Gly Ala
              180   185   190

Met Lys Phe Val Lys Gly Asp Ala Ile Ala Gly Leu Ile Ile Ile Phe
          195   200   205

Val Asn Ile Leu Gly Gly Val Thr Ile Gly Val Thr Gln Lys Gly Leu
210   215   220

Ser Ala Ala Asp Ala Leu Gln Leu Tyr Ser Ile Leu Thr Val Gly Asp
225   230   235   240

Gly Met Val Ser Gln Val Pro Ala Leu Leu Ile Ala Ile Thr Ala Gly
              245   250   255

Ile Ile Val Thr Arg Val Ser Ser Glu Glu Ser Ser Asp Leu Gly Thr
          260   265   270

Asp Ile Gly Ala Gln Val Val Ala Gln Pro Lys Ala Leu Leu Ile Gly
          275   280   285

Gly Leu Leu Leu Val Leu Phe Gly Leu Ile Pro Gly Phe Pro Met Ile
      290   295   300

Thr Phe Phe Ala Leu Ser Ala Ile Val Thr Ala Gly Gly Tyr Phe Ile
305   310   315   320

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Gly Leu Arg Gln Arg Lys Ala Gln Ser Ser Asn Ser Gln Asp Leu Pro
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Ala Val Leu Ala Gln Gly Ala Gly Ala Pro Ala Ala Arg Ser Lys Pro
              340                 345                 350

Lys Pro Gly Ser Lys Pro Arg Gly Lys Leu Gly Glu Lys Glu Glu Phe
              355                 360                 365

Ala Met Thr Val Pro Leu Leu Ile Asp Val Asp Ala Ala Leu Gln Ala
          370                 375                 380

Glu Leu Glu Ala Ile Ala Leu Asn Asp Glu Leu Val Arg Val Arg Arg
385                 390                 395                 400

Ala Leu Tyr Leu Asp Leu Gly Val Pro Phe Pro Gly Ile His Leu Arg
              405                 410                 415

Phe Asn Glu Gly Met Gly Pro Gly Glu Tyr Leu Ile Gln Leu Gln Glu
              420                 425                 430

Val Pro Val Ala Arg Gly Leu Leu Arg Pro Gly His Gln Leu Val Gln
              435                 440                 445

Glu Ser Ala Ser Gln Leu Asp Leu Leu Gly Ile Pro Tyr Glu Glu Gly
          450                 455                 460

Ala Pro Leu Leu Pro Gly Gln Pro Thr Leu Trp Val Ala Asn Glu His
465                 470                 475                 480

Gln Glu Arg Leu Glu Lys Ser Arg Leu Ala Thr Leu Thr Thr Asp Gln
              485                 490                 495

Val Met Thr Trp His Leu Ser His Val Leu Arg Glu Tyr Ala Glu Asp
          500                 505                 510

Phe Ile Gly Ile Gln Glu Thr Arg Tyr Leu Leu Glu Gln Met Glu Gly
          515                 520                 525

Ser Tyr Ser Glu Leu Val Lys Glu Ala Gln Arg Ile Ile Pro Leu Gln
          530                 535                 540

Arg Met Thr Glu Ile Leu Gln Arg Leu Val Gly Glu Asp Ile Ser Ile
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Arg Asn Met Arg Ala Ile Leu Glu Ala Met Val Glu Trp Gly Gln Lys
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Glu Lys Asp Val Val Gln Leu Thr Glu Tyr Ile Arg Ser Ser Leu Lys
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Arg Tyr Ile Cys Tyr Lys Tyr Ala Asn Gly Asn Asn Ile Leu Pro Ala
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Tyr Leu Leu Asp Gln Gln Val Glu Glu Gln Leu Arg Gly Gly Ile Arg
    610                 615                 620

Gln Thr Ser Ala Gly Ser Tyr Leu Ala Leu Asp Pro Thr Ile Thr Gln
625                 630                 635                 640

Ser Phe Leu Asp Gln Val Arg His Thr Val Gly Asp Leu Ala Gln Met
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Gln Asn Lys Pro Val Leu Ile Val Ser Met Asp Ile Arg Arg Tyr Val
            660                 665                 670

Arg Lys Leu Ile Glu Gly Asp Tyr His Ala Leu Pro Val Leu Ser Tyr
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Leu
705
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Ala Ala Leu Tyr Leu Leu Ala Glu Ala Thr Leu Ala Val Leu Gly Pro
            20                  25                  30

Gly His Phe Leu Tyr Gly Asn Val Asp Val Phe Arg Ser Ser Ser Leu
        35                  40                  45

Ser Ser Glu Arg Leu Gly Arg Phe Tyr Leu Arg Trp Thr Gly Ala Ser
    50                  55                  60

Glu Pro Glu Pro Gly Trp Phe Met Leu Ala Thr Glu Gln Val Cys Ser
65                  70                  75                  80
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Leu Arg Asp Met Arg Lys Arg Gln Lys His Gly Leu Ala
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Met Lys Gln Pro Arg Phe Ala Asp His Ser Glu Thr Ile Ser Gln Ala
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Glu His Gly Ile Ala Asp Ser Asp His Arg Asn Ala Leu Leu Gln Glu
                20   25   30

Met Leu Ala Gly Leu Ala Leu Ser Asp Gln Thr Cys Gln Leu Leu Phe
                35   40   45

Glu Ala Pro Thr Glu Gln Val Ala Val Ala Glu Gln Glu Leu Leu Ala
        50   55   60

Glu Ile Gln Arg Arg Gln Ala Leu Leu Pro Ala Gln Pro Gly Glu Gly
65   70   75   80

Arg Lys Ser Arg Arg Pro Thr Ile Met Arg Gly Leu Met Ile
                85   90

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<213>   Aeromonas salmonicida

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Met Ser Thr Ile Pro Asp Tyr Asn Thr Asn Pro Gly Ala Phe Val Gly
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Trp Leu Asp Val Gln Ala Leu Asn Thr Leu Pro Gly Asn Lys Asn Pro
                20   25   30

Lys Leu Thr Glu Leu Val Glu Leu Leu Lys Gly Lys Ile Thr Ile Ser
        35   40   45

Ala Asp Ser Ser Thr Ala Leu Ser Lys Glu Gln Leu Glu Lys Leu Leu
        50   55   60

Ala Ala Tyr Leu Thr Asp Pro Ala Ser Ile Asn Gly Gly Trp Ala Met
65   70   75   80

```
Gly Gln Phe Lys Gly Gly Gln Asp Ala Ala Ile Ala Ala Ile Lys Gly
                85              90              95

Val Ile Glu Arg Gly Ala Lys Gln Thr Pro Pro Val Thr His Trp Thr
            100             105             110

Ile Pro Glu Phe Met Leu Leu Ser Leu Ser Ala Leu Thr Met Glu Arg
        115             120             125

Thr Asp Asp Asp Leu Ile Thr Thr Phe Thr Gly Val Met Met Phe Gln
    130             135             140

Asp Asn Gln Arg Lys Gly Leu Arg Asp Glu Leu Ala Glu Met Thr Ala
145             150             155             160

Glu Leu Lys Ile Tyr Gly Val Ile Gln Ser Glu Ile Asn Gln Val Leu
            165             170             175

Ser Ala Ala Ser Asn Gln Thr Phe Lys Thr Asn Phe Asn Leu Met Asp
        180             185             190

Tyr Lys Leu Tyr Gly Tyr Glu Ser Leu Ala Lys Phe Met Glu Gly Gly
        195             200             205

Glu Phe Lys Leu Leu Ser Lys Met Phe Ser Asp Glu Gln Val Thr Lys
    210             215             220

Ala Gln Gln Asp Phe Thr Asn Ala Lys Asn Glu Leu Glu Asn Val Thr
225             230             235             240

Ser Thr Ser Leu Asn Pro Lys Ile Gln Ala Glu Ala Lys Thr Asp Tyr
            245             250             255

Glu Arg Lys Lys Ala Ile Phe Glu Glu Ile Val Glu Thr Gln Ile Ile
        260             265             270

Thr Leu Lys Thr Phe Leu Glu Ser Asp Leu Lys Lys Ser Gly Ala Met
        275             280             285

Ser Gly Ile Glu Ala Glu Tyr Lys Tyr Asp Lys Asp Asn Asn Lys Leu
    290             295             300

Gly Asn Phe Ser Thr Ser Val Ser Asp Arg Ser Arg Pro Leu Asn Asp
305             310             315             320

Leu Val Ser Glu Lys Thr Ala Arg Leu Asn Asp Val Ser Ser Arg Tyr
            325             330             335
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Asn Ala Ala Ile Glu Ala Leu Asn Arg Phe Ile Gln Lys Tyr Asp Ser
            340                 345                 350
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Ile Met Arg Asp Ile Leu Gly Ala Ile
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1               5                   10                  15
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Ala Phe Met Ala Asp Gly Gly Thr Leu Ala Met Leu Gln Asp Ile Ser
            20                  25                  30
```

```
Gly Asp Thr Leu Glu Gln Leu Tyr Ala Leu Ala Phe Ser Gln Tyr Gln
        35                  40                  45
```

```
Ala Gly Lys Trp Glu Asp Ala His Lys Ile Phe Gln Ala Leu Cys Met
    50                  55                  60
```

```
Leu Asp His Tyr Glu Pro Arg Tyr Phe Leu Gly Leu Gly Ala Cys Arg
65                  70                  75                  80
```

```
Gln Ala Met Gly Glu Phe Glu Thr Ala Val Gln Ser Tyr Ser Phe Gly
                85                  90                  95
```

```
Ala Met Leu Asp Leu Lys Asp Pro Arg Phe Pro Phe His Ala Gly Glu
            100                 105                 110
```

```
Cys Arg Leu Gln Gln Gly Asp Leu Asn Gly Ala Glu Ser Gly Phe His
        115                 120                 125
```

```
Ser Ala Arg Leu Leu Ala Asp Thr Asp Pro Gln Gln Ala Asp Leu Ala
    130                 135                 140
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Ala Ser Ala Lys Val Met Leu Glu Ala Ile Ala Ile Arg Arg Asp
145                 150                 155
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